



PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Confirmation No.: 8338

Application No.: 10/702,419

Applicant: HRYN, et al.

Filing Date: November 5, 2003

Application: PROCESS FOR ELECTROLYTIC PRODUCTION OF ALUMINUM

Examiner: Nicholas A. Smith

Art Unit: 1742

Atty Docket No.: 0003-01398

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first Class Mail, pursuant to 37 C.F.R. 1.8 to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia, 22313 on July 2, 2007

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37 C.F.R. 1.132 Affidavit of Inventor
John N. Hrym

I, John N. Hrym, declare that I am an inventor in the above-identified matter and I further state the following:

1. I received my B.A.Sc. Degree in Metallurgy and Materials Science from the University of Toronto, my M.A.Sc. Degree in Metallurgy and Materials Science from the University of Toronto, and my Ph.D. in Metallurgy and Materials Science from the University of Toronto.

In Re: Hryna (10/702,419)
37 C.F.R. 1.132 Affidavit
Page -2-

2. Since 2006, I have been a research engineer (Senior Development Associate) at Praxair, Inc., in the field of Metals and Materials Processing R&D. My primary research emphasis is on aluminum technologies. From 1993 to 2006, I was a research engineer at Argonne National Laboratories, and since 1994 my primary research emphasis has been on aluminum related technologies.

3. Prior to my employ at Argonne Laboratory, I was a post-doctoral fellow at Massachusetts Institute of Technology (MIT) from 1991 to 1992 where I began my work on aluminum electrolysis.

4. I have published approximately 10 papers in the area of aluminum processing. Representative publications include Yang, J., Hryna, J.N., Davis, B.R., Roy, A., Krumdick, G.K., Pomykala, J.A., Jr., "New opportunities for aluminum electrolysis with metal anodes in a low temperature electrolyte system," in Light Metals 2004, The Minerals Metals and Materials Society, Warrendale, Penn, (2004) pp. 321-326 and Yang, J., Graczyk, J.G., Hryna, J.N., "Alumina solubility in a KF-AlF₃-based low temperature electrolyte system," in Light Metals 2006, The Minerals Metals and Materials Society, Warrendale, Penn, (2006).

5. I have received numerous patents, (including patent numbers: 6,485,541 B1, 6,083,362, 6,461,491 B1, 6,375,813 B1) for research related to aluminum processing. Also, I was awarded the Federal Laboratory Consortium Technology Transfer Award for research related to electrodialysis processing.

6. I have read the March 1, 2007 Official Action. It is my understanding that my invention is being rejected by U.S. Patent No. 6,379,512 and U.S. Patent No. 6,436,272, both issued to Brown. Brown does not teach dissolved alumina above 2 wt. %.

7. Brown's electrolyte has a dissolved alumina load of 1-2 wt. %. To compensate for this low alumina solubility, Brown requires larger amounts of undissolved alumina in close proximity. This higher load of undissolved alumina renders his electrolyte a slurry, and not a liquid. Brown acquiesces to a 1-2 percent alumina solubility ceiling and up to 20% undissolved alumina because Brown is a slurry-type system. Slurries, by definition, have undissolved particles. (See PTCL definition of "slurry", attached.) They are less efficient electrolytes compared to liquid electrolytes, as discussed in my application on page 2, lines 26-30.

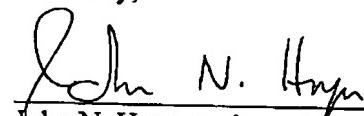
8. My invented electrolyte enables 4-6 wt. % solubility of alumina by minimizing sodium loads. Such high solubility renders my electrolyte a *liquid*. Therefore, the efficiency of aluminum production via electrolysis greatly improves, as noted in my previous affidavit.

In Re: Hryna (10/702,419)
37 C.F.R. 1.132 Affidavit
Page -3-

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Sincerely,

June 29, 2007
Date


John N. Hryna
John N. Hryna, co-inventor